REMARKS

This response is submitted in response to the Final Office Action dated November 20, 2002, and respectfully requests that the Examiner reconsider the rejection of the claims as set forth therein. In the event that the Examiner determines that the foregoing Amendments do not place the application in condition for allowance, it is respectfully requested that the foregoing Amendments be entered to place the claims in better form for consideration upon appeal.

At the outset, prior to addressing the merits of the issues raised in the Office Action, the applicants call to the Examiner's attention that, although it was not required by the Examiner, claim 1 has been amended again to improve claim form this time primarily to enhance the recitation of the difference in the alignment of the first alignment layer at the signal line regions as differing from the alignment direction of the first alignment layer at the pixel aperture regions, and the alignment direction of the second alignment layer at the signal line regions as differing from the alignment direction of the second alignment layer at the pixel aperture regions. Claim 1 has also been amended to recite "said pixels including apertures, said apertures and a part of said pixel electrodes defining pixel aperture regions". Other editorial changes have also been made concerning the recitation of the scan lines, the signal lines, the pixels and the pixel electrodes. All of the changes are supported by the previous language of claim 1 and also by the disclosure of FIGS. 7, 8 and 9. No new matter has been added.

The applicants have also amended claim 24 to define adjacent regions as follows: --signal lines connected to said switching elements, said signal lines including adjacent regions, said signal lines and said adjacent regions defining signal line regions,-- to replace the term "of said signal lines and their vicinities". The adjacent regions of the signal lines are supported by FIG. 16. Claim 24 has also been amended to replace the limitation "voltage is applied to said light-shielding layer such that the *director* of liquid crystal molecules" by the limitation -- voltage is applied to said light-shielding layer such that the direction of liquid crystal molecules--. This amendment to claim 24 is supported by the specification on page 43, lines 8-11: "The direction of the director of the liquid crystal is therefore always oriented in a direction substantially perpendicular to the substrate." Other minor editorial amendments to claim 24 have also been made to improve claim form.

Applicants have attached hereto a marked-up version of the claims showing the amendments made thereto. It is entitled "Version With Markings to Show Changes Made."

35 U.S.C. 103(a) Rejections: Claims 1-2, 5-6, 9, 12, 15-16, 20 and 23-27

The Examiner has again rejected claims 1-2, 5-6, 9, 12, 15-16, 20 and 23-27 under 35 U.S.C. 103(a) as being unpatentable over Ohta et al. (US 6,064,460 – filed May 15, 1998 – issued May 16, 2000) in view of Numano et al (US 6,313,898 B1 – filed December 15, 1998 – issued November 6, 2001).

In the Response of August 22, 2002, the applicants presented a comparison table between Ohta et al, Numano et al, and the present invention of claim 1. Based on the comparison table, the applicants argued that in Numano et al, the intermediate alignment films 19a in FIG. 7 are illustrated as being positioned solely under the black matrices 16 so that the alignment process is limited solely to the regions directly under the black matrices 16. In contrast, the applicants argued that in the present invention of claim 1, the alignment process occurs in the signal line regions and the pixel aperture regions.

Although the Examiner in reply does agree that in Numano et al, the intermediate alignment films 19a are formed over the black matrices 16, nevertheless, the Examiner asserts that the intermediate alignment has a portion, e.g. intermediate alignment films 19a in FIG. 7 and intermediate alignment film 13a in FIG. 2 corresponding to signal line regions, i.e., signal wiring 7 in FIG. 2 and pixel aperture regions, i.e., adjacent pixel electrodes 12. The Examiner in effect asserts that in other words, in Numano et al, the alignment layer process does occur in the signal line regions and the pixel aperture regions, as recited by claim 1.

The applicants also argued that neither Ohta et al nor Numano et al disclose, teach or suggest switching elements that individually control electric fields applied to pixel electrodes of said pixels. The Examiner asserts in reply that according to the active matrix LCD device, switching elements, namely thin-film transistors, form in the LCD device for controlling electric fields applied to pixel electrodes. Therefore, the Examiner further asserts that the switching elements in Ohta et al

and/or in Numano et al would individually control electric fields applied to pixel electrodes of said pixels, as claimed.

In response, the applicants note that in Numano et al, FIG. 7, the direction of orientation of the liquid crystal molecules is changed at the signal wiring regions 7 as compared to the direction of orientation at the adjacent pixel electrodes 12 and 12a (shown in FIG. 11(a) of Numano et al). In Numano et al, FIG. 7, there is no pixel aperture region which includes the pixel aperture and a part of the pixel electrodes, as recited by claim 1. The pixel electrodes 12 and 12a each occupy the entire respective pixel aperture.

In contrast to Numano et al, claim 1, as amended as noted previously, now recites "alignment direction of said first alignment layer at said signal line regions differing from alignment direction of said first alignment layer at said pixel aperture regions, and

alignment direction of said second alignment layer at said signal line regions differing from alignment direction of said second alignment layer at said pixel aperture regions". Furthermore, claim 1 has been amended to define pixel aperture regions as apertures and a part of said pixel electrodes.

Therefore, the orientation of the alignment direction of the second alignment layer at the signal line regions differs from the alignment direction of the second alignment layer *at the pixel aperture regions, which include only a part of the pixel electrode and not the entire pixel electrode as is the case in Numano et al.*

Neither Ohta et al, nor Numano et al, taken alone or in combination,

disclose, teach or suggest alignment direction of said second alignment layer at said signal line regions differing from alignment direction of said second alignment layer at said pixel aperture regions, nor pixel aperture regions which include only a part of the pixel electrode, as recited by claim 1.

Even if one or ordinary skill in the art were to somehow combine the in-plane switching device of Ohta et al with the alignment layers of Numano et al, the hypothetical device resulting from such a combination would not yield the present invention of claim 1.

Therefore, claim 1 patentably distinguishes over Ohta et al and Numano et al. As a result, the applicants respectfully request the Examiner to withdraw the rejections of claims 1-2, 5-6, 9, 12, 15-16, 20 and 23.

With respect to claim 24, the applicants maintain that the Examiner has not provided any specific arguments against independent apparatus claim 24, which is directed to the second embodiment of the invention as disclosed, for example, by FIGS. 15 and 16.

The applicants maintain that neither Ohta et al nor Numano et al, taken alone or in combination, disclose, teach or suggest the limitations of claim 24, as amended, of a "second transparent substrate being provided with: at least a second alignment layer on the highest layer, and a light-shielding layer having aperture regions of said pixels below said alignment layer".

Therefore, claim 24, as amended, patentably distinguishes over Ohta et al and Numano et al, taken alone or in combination. As a result, the applicants respectfully request the Examiner to withdraw the rejections of claims 24-27.

35 U.S.C. 103(a) Rejections: Claims 2, 6, 9, 12, 16 and 20

The Examiner has again rejected claims 2, 6, 9, 12, 16 and 20 as being unpatentable over Ohta et al in view of knowledge notoriously well known in the art to reduce a driving voltage in a LCD device by using liquid crystal molecules having a positive dielectric constant anisotropy.

The Examiner asserts that the combination of Ohta et al and Numano et al does show the alignment layer process occurring in the signal line regions and the pixel aperture regions. The Examiner asserts further that such claims would have been obvious in view of the notoriously well known knowledge in the LCD art.

In response, the applicants maintain that the notoriously well known knowledge cited by the Examiner does not overcome the deficiencies of Ohta et al with respect to claim 1 and therefore, claims 2, 6, 9, 12, 16 and 20 patentably distinguish over Ohta el in view of the notoriously well known knowledge cited by the Examiner.

Therefore, the applicants request that the Examiner withdraw the rejection under 35 U.S.C. 103(a) of claims 2, 6, 9, 12, 16 and 20.

In view of the foregoing Remarks, entry of this amendment is requested. The foregoing Amendment and Remarks establish the patentable nature of all of the elected claims in the application, i.e., generic claim 1 and elected claims 2, 5-6, 9, 12, 15-16, 20 and 23-27. No new matter has been added, and no new issues have been raised, wherefore early and favorable reconsideration and issuance of a Notice of Allowance are respectfully requested.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claim 1 has been amended as follows:

1. (Twice Amended) A liquid crystal display device comprising

a first transparent substrate and a second transparent substrate arranged to confront each other, and

a liquid crystal component layer sealed between said first transparent substrate and said second transparent substrate,

said first transparent substrate being provided with

a transparent insulating substrate,

a plurality of scan lines,

a plurality of signal lines provided perpendicularly to each of said scan lines,

a plurality of pixels arranged in matrix form surrounded by said scan lines and said signal lines,

[pixel electrodes and] a plurality of common electrodes provided substantially parallel at both sides of said signal lines [and alternately arranged on said transparent insulating substrate, a plurality of pixels arranged in matrix form, scan lines and],

pixel electrodes provided between said common electrodes at each of said pixels,

switching elements connected to said signal lines that individually control electric fields applied to said pixel electrodes of said pixels,

[signal lines connected to said switching elements;]

common lines that supply a prescribed electric potential to said common electrodes [of said pixels, and],

a first alignment layer formed on the highest layer of said first transparent substrate,[; and said second transparent substrate is provided with at least]

a second alignment layer formed on the highest layer of said second transparent substrate,

said signal lines including adjacent regions, said signal lines and said adjacent regions defining signal line regions, and

said pixels including apertures, [said pixels and] said apertures [including adjacent regions, said pixels and said apertures and said adjacent regions] and a part of said pixel electrodes defining pixel aperture regions, [and

specific alignment processing is carried out such that] alignment [of said first alignment layer and said second alignment layer] direction of said first alignment layer at said signal line regions [differs at said signal line regions and] differing from alignment direction of said first alignment layer at said pixel aperture regions, and

alignment direction of said second alignment layer at said signal line regions differing from alignment direction of said second alignment layer at said pixel aperture regions.

Claim 24 has been amended as follows:

24. (Amended) A liquid crystal display device comprising

a first transparent substrate and

a second transparent substrate arranged to confront each other, and

a liquid crystal component layer sealed between said first transparent substrate and said second transparent substrate[; wherein],

said first transparent substrate [is] being provided with:

a transparent insulating substrate,

pixel electrodes and common electrodes substantially parallel and alternately arranged on said transparent insulating substrate,

a plurality of pixels arranged in matrix form,

scan lines and switching elements that individually control electric fields applied to pixel electrodes of said pixels,

signal lines connected to said switching elements, said signal lines including adjacent regions, said signal lines and said adjacent regions defining signal line regions,

common lines that supply a prescribed electric potential to common electrodes of said pixels and a first alignment layer formed on the highest layer; and

said second transparent substrate [is] being provided with:

at least a second alignment layer on the highest layer, and a light-shielding layer having aperture regions of said pixels below said alignment layer,

said liquid crystal component [has] having a positive dielectric constant anisotropy,

said first alignment layer and said second alignment layer [undergo] undergoing an alignment process so as to have an inclination of any angle θ which is neither parallel nor orthogonal to the longitudinal direction of said pixel

electrode,

said light-shielding layer [is] being formed from a conductor and

voltage is applied to said light-shielding layer such that the [director] direction of liquid crystal molecules within said liquid crystal component layer in said signal line regions [of said signal lines and their vicinities] is aligned substantially perpendicular to said first transparent substrate.